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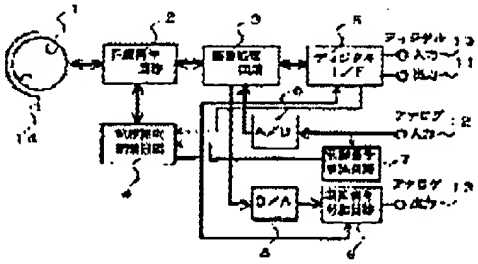
(54) VIDEO SIGNAL RECORDING DEVICE AND REPRODUCING DEVICE

(57)Abstract:
PURPOSE: To cope with the limit of the copying frequency to perform the copy control of high reliability by inserting copy information in the vertical blanking period of a video signal and executing or inhibiting recording in accordance with copy information at the time of recording.
CONSTITUTION: At the time of recording an analog video signal, the video signal inputted from an input terminal 12 is converted to a digital signal and is subjected to processing such as compression by a picture processing circuit 3, and control information or the like is added by a recording/reproducing circuit 2, and this digital signal is recorded on a magnetic tape 14 by a rotary head 1. At this time, a control signal detecting circuit 7 detects copy information in the analog video signal, and a recording/reproducing control circuit 4 decides permission/inhibition of copy in accordance with the presence/absence of copy information. When copy is permitted, the recording/reproducing control circuit 4 adds copy information to the video signal and permits the recording/reproducing circuit 2 to record the signal on the magnetic tape 14; but when it is inhibited, the circuit 4 inhibits the recording operation itself of the recording/reproducing circuit 2.



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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Industrial Application] This invention relates to the recording device and regenerative apparatus which change a video signal into a digital signal and carry out record playback, and when restricting the copy of software (the content of the record medium recorded on videotape) especially, it relates to suitable equipment.
[0002]
[Description of the Prior Art] Conventionally, the technique inserts a false synchronization pulse like a publication in JP,61-288582,A, and prevent from recording on it normally as an approach of restricting the copy of software in a video-signal record regenerative apparatus was mainly used. This makes video signal level detect accidentally by existence of a false synchronization pulse at the time of record of VTR, and it makes a gain control circuit malfunction by this, and it is made to bring a record result which cannot be satisfied.
[0003]
[Problem(s) to be Solved by the Invention] Since it is made for the technique by the above-mentioned conventional technique not to bring a record result which the gain control circuit of a recording device is made to malfunction, and cannot be satisfied and record actuation is not forbidden thoroughly primarily, the copy result of the software by which copy prohibition was carried out is influenced to some extent by the engine performance of a recording device. moreover, although the simple copy limit by the existence of the existence of a false synchronization pulse was completed, the copy was permitted only once, and 2nd henceforth had the problem that it could not be coped with in the software which had it meant to carry out copy prohibition, when the count of a copy was restricted namely,.
[0004] The place which this invention was made in view of the above-mentioned point, and is made into the object can respond to a limit of the count of a copy etc., and is to offer the video-signal record regenerative apparatus which can perform reliable copy control.
[0005]
[Means for Solving the Problem] The above-mentioned object rewrites two or more bits digital copy information if needed during the vertical blanking interval of a video signal, and makes insertion possible, and record or record prohibition is made to be carried out according to digital copy information at the time of record.
[0006]
[Function] At the time of playback, copy information is added to a playback video-signal output corresponding to the content of the copy information beforehand added to the playback video signal from the record medium. At the time of record, the copy information in the inputted video signal is detected, and authorization/prohibition of the copy (record) of an input video signal are controlled based on this. Moreover, in copying an input video signal (record), corresponding to the existence and the content of copy information which were beforehand added to the input video signal, it adds the copy information generated suitably to the video signal to record. By making it Mr. **, it can respond to a limit of the count of a copy etc., and reliable copy control can be performed.
[0007]
[Example] Hereafter, the example illustrating this invention explains. Drawing 1 is the block diagram showing the important section configuration of the digital image record regenerative apparatus (digital video tape recorder) concerning one example of this invention, and is set to this drawing. The rotary head to which 1 carries out record playback of the video signal on a magnetic tape 14, the record regenerative circuit where 2 detects the data at the time of generation of the record signal at the time of record, and playback, The image-processing circuit where 3 processes compression extension of a video signal etc., the record playback control circuit where 4 controls record playback actuation, The digital interface circuitry to which 5 outputs and inputs a digital video signal (an interface circuitry is called below), The A/D-conversion circuit where 6 changes an analog video signal into a digital signal, The control signal detector where 7 detects the control signal in an analog video signal (copy information is included at least), The D/A conversion circuit from which 8 changes a digital video signal into an analog signal, For the control signal addition circuit where 9 adds a control signal (copy information is included at least) to an analog video signal, and 10, as for the output terminal of a digital video signal, and 12, the input terminal of a digital video signal and 11 are [the input terminal of an analog video signal and 13] the appearance terminals of an analog video signal.
[0008] In the above-mentioned configuration, at the time of record of an analog video signal, the video signal inputted from the input terminal 12 is changed into a digital signal with A/D converter 6, and is inputted into the image-processing circuit 3. And compression etc. is processed, an error correcting code, control information, etc. are added in the record regenerative circuit 2, and it records on a magnetic tape 14 by the rotary head 1. At this time, the copy information in an analog video signal is detected, and it outputs to the record playback control circuit 4 in the control signal detector 7. the record playback control circuit 4 -- the content of this copy information -- or by the existence of copy information, while judging authorization/prohibition of a copy, when it is judged that a copy is possible, copy information recorded on a magnetic tape 14 is generated. And when it is judged that a copy is possible, the record playback control circuit 4 carries out the record regenerative circuit 2, and when add the copy information generated with the video signal, and it is made to record on a magnetic tape 14 and is judged as the prohibition on a copy, the record playback control circuit 4 forbids the record actuation by the record regenerative circuit 2 itself.
[0009] Moreover, at the time of record of a digital video signal, the digital signal inputted from the input terminal 10 is inputted into an interface circuitry 5. In an interface circuitry 5, separation of the video signal from an input signal and detection of a control signal are performed. And a video signal is inputted into the image-processing circuit 3, and a control signal is inputted into the record playback

control circuit 4. While judging authorization/prohibition of a copy like the time of record of an analog video signal in the record playback control circuit 4 according to the content of the control signal including copy information also in this case, when it is judged that a copy is possible, copy information recorded on a magnetic tape 14 is generated. And when it is judged that a copy is possible, the record playback control circuit 4 carries out the record regenerative circuit 2, and when add the copy information generated with the video signal, and it is made to record on a magnetic tape 14 and is judged as the prohibition on a copy, the record playback control circuit 4 forbids the record actuation itself.

[0010] The signal reproduced by the rotary head 1 from the magnetic tape 14 at the time of playback is inputted into the record regenerative circuit 2. An error correction, detection of a control signal, etc. are performed in the record regenerative circuit 2. And a video signal is inputted into the image-processing circuit 3, and after processing of extension etc. is performed, it is outputted to an interface circuitry 5 and the D/A conversion circuit 8. A control signal (what includes copy information at least) is inputted into the record playback control circuit 4, and the record playback control circuit 4 distinguishes the content of the copy information reproduced from the magnetic tape 14, and it generates the copy information (control signal) added to a video-signal output according to this. And in an interface circuitry 5, the copy information (control signal including copy information) generated in the record playback control circuit 4 is added to the digital video signal outputted from the image-processing circuit 3, and it outputs to it from an output terminal 11. On the other hand, the copy information generated in the record playback control circuit 4 is added to the analog video signal outputted from the D/A conversion circuit 8, and it is made to output to it from an output terminal 13 in the control signal addition circuit 9.

[0011] Drawing 2 shows one example of a digital-input/output signal. The digital-input/output signal is constituted per block, as shown in this drawing, and 1 block consists of synchronizing signals 15, control signals 16, and video signals 17. And the control signal 16 is constituted by the information currently recorded with the video signal of copy information and others. Moreover, the video signal 17 is constituted by the two or more words digital video signal. In addition, if the signal with which it was compressed before elongating as this video signal is used, the transmission rate of a digital-input/output signal can be made low. In this case, what is necessary is just to also include the information about compression in the control signal. If the signal of drawing 2 is modulated and transmitted, it will become unnecessary to transmit a synchronous clock further again.

[0012] Drawing 3 shows one example of the vertical blanking interval of an analog I/O signal. In this drawing, 18 is a horizontal synchronizing pulse and 19 is a control signal. A vertical blanking interval is a part which is not displayed on a screen, and has become a non-signal state in the usual analog video signal. By adding the same control signal as the case of a digital-input/output signal to this part, also when transmitting an image with an analog signal, a control signal like copy information can be transmitted.

[0013] Drawing 4 shows one at the time of adding copy information as control information of an analog I/O signal. As for 20 and 23, in this drawing, a synchronizing signal, and 21 and 22 are copy information. Here, copy information supposes that it consists of 2 bits, and is raising ability to detect by adding a synchronizing signal forward and backward. Furthermore, if multiplex writing of this is carried out to several lines, ability to detect can be raised more.

[0014] Drawing 5 shows other one at the time of adding copy information as control information of an analog I/O signal. In drawing 5 , it has added to JP,61-288582,A which described copy information above by the same signal as the false synchronization pulse of a publication. If it does in this way, a copy can be restricted also when recording with the usual analog video tape recorder. Moreover, if it enables it to detect also about a false synchronization pulse in said control signal detector 7, a copy can be restricted also about the case where the video signal reproduced with the analog video tape recorder is recorded.

[0015] Next, one using the copy information in the record playback control circuit 4 of the control technique of record playback is explained. The above mentioned copy information shall be now made into 2 bits, and "11" shall be recorded about what accepts "01" and a copy only once about what does not accept "00" and a copy at all about a thing without the need of restricting the copy of the software which the user created. At the time of playback, a thing equivalent to the copy information detected out of the regenerative signal is added and outputted to a digital video signal and an analog video signal.

[0016] On the other hand at the time of record, record is controlled according to the copy information added to the inputted digital video signal or analog video signal. Now, when the copy information in an input signal is "00", the copy information to record also records as "00." Moreover, when copy information is "11", it records by rewriting the copy information to record with "10" (when accepting a copy only once), and when the copy information in an input signal is "10" It does not record by judging it as the prohibition on a copy (although it is for distinguishing whether the tape became that by which full copy prohibition was carried out from the beginning, and the thing by which copy prohibition was carried out after the copy, being referred to as "10", without rewriting with "01", when copy information is "11"). Even if it rewrites "11" with "01", a control top does not interfere. Moreover, if it makes as [change / by the case where it is not detected with the case where a false synchronization pulse is detected / record control] when the analog video signal with which the video signal reproduced with the analog video tape recorder or copy information is not added is inputted, transposition with the conventional analog video tape recorder can be taken. That is, when generate "00" as copy information (when copy information is not detected), and copy information "00" is added to a video signal, when a false synchronization pulse is not detected, and it records and a false synchronization pulse is detected, it is regarded as that copy information "01" was detected and equivalence, and record actuation is forbidden.

[0017] By this example, although the equipment of record playback combination was explained, this invention is applicable also to the equipment only only for records and for playbacks here. Moreover, this invention can be applied and can transmit a control signal to the equipment which carries out record playback with an analog video signal similarly. Moreover, a control signal can also transmit information other than copy information, for example, adds and transmits the program information currently added and recorded on the video signal also to an analog video signal, and if the control signal recorded using the information at the time of a copy is generated, the copy by the analog video signal can also copy control information.

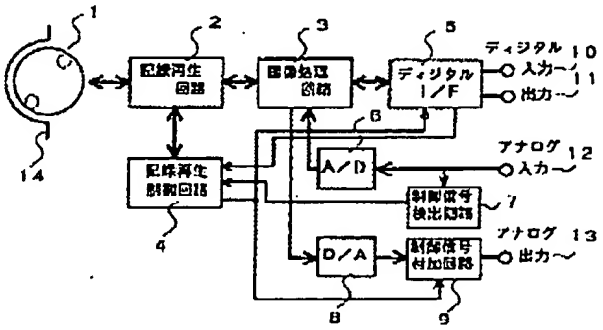
[0018]

[Effect of the Invention] As mentioned above, according to this invention, also in the copy of the video signal through an analog video signal, a limit of the count of a copy etc. can be performed and reliable copy control can be performed.

[Translation done.]

Drawing selection: Representative drawing

図1



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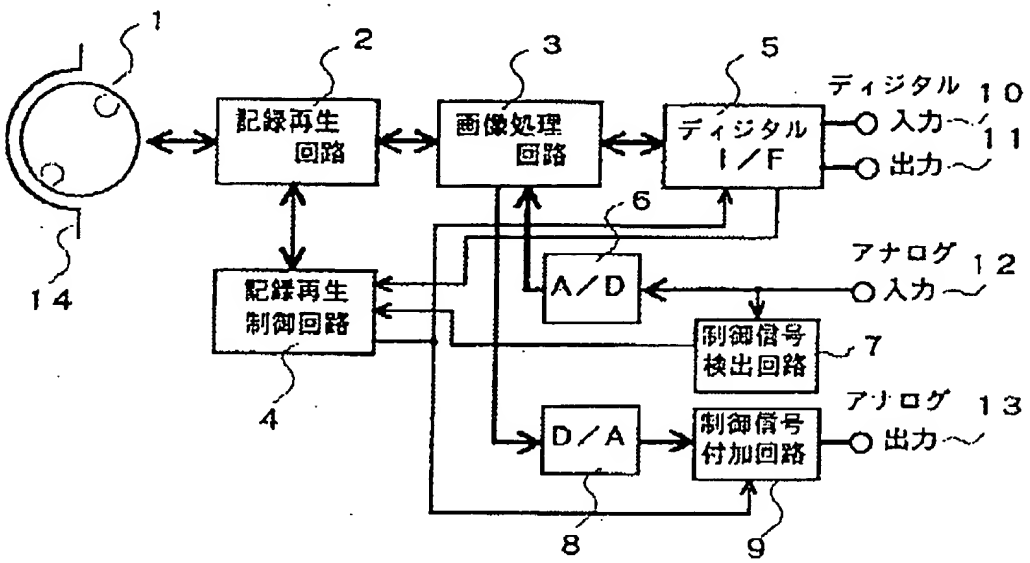
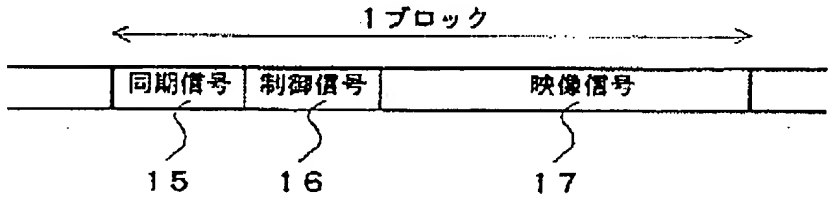
DRAWINGS

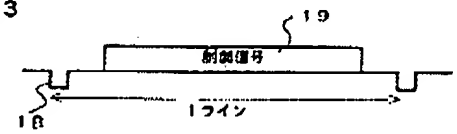
[Drawing 1]
図1



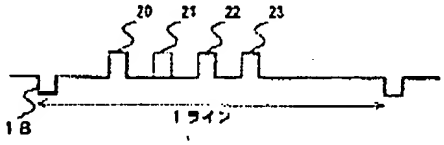
[Drawing 2]
図2



[Drawing 3]
図3

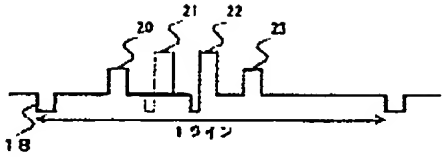


[Drawing 4]
図4



[Drawing 5]

図5



[Translation done.]